FAA-E-2086a
August 22, 1968
SUPERSEDING
FAA-E-2086, 3/4/64

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION SPECIFICATION

RADIO PATCH SYSTEM, 20-CHANNEL

1. SCOPE AND CLASSIFICATION

1.1 Scope.- The equipment specified herein consists of two panels which may be used in combinations to build up patching fields for assignment of communications channels to various control positions. Each channel terminates one transmitter audio pair, one receiver audio pair, a keying circuit, an interlock circuit, an indicator light circuit, and one "common wire."

1.2 Classification.- Two types of patch panels are specified herein as follows:

Type I - Patch Panel, 20-Channel

Type II - Patch Cord Panel

2. APPLICABLE DOCUMENTS

2.1 FAA specifications.- The following FAA specifications, of the issues specified in the invitation for bids or request for proposals, form a part of this specification:

FAA-D-1272	Instruction Booklets, Electronic Equipment
FAA-G-2100/1	Electronic Equipment, General Requirements; Part 1 General Requirements for all Equipments

(Copies of this specification and other applicable FAA specifications and drawings may be obtained from the Federal Aviation Administration, Washington, D. C. 20590, Attention: Contracting Officer. Requests should fully identify material desired, i.e., specification numbers, dates, amendment numbers, complete drawing numbers; also, requests should state the contract involved or other use to be made of the requested material.)

2.2 Military specifications.- The following Military specifications, of the issues in effect on date of the invitation for bids or request for proposals, form a part of this specification to the extent specified hereinafter:

MIL-I-45208A Inspection System Requirements

MIL-E-17555 Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of (Information on obtaining copies of Military specifications is given in Supplement-1 to FAA-G-2100/1.)

3. REQUIREMENTS

3.1 Equipment to be furnished by the contractor.- The equipment to be furnished under this specification consists of two panels (quantities of each as specified in the contract schedule), referred to herein under the following nomenclature:

Type I - Patch Panel, 20-Channel	3.6
Type II - Patch Cord Panel	3.7

Each type of panel furnished shall be complete in accordance with all specification requirements. Instruction booklets shall be furnished in accordance with Specification FAA-D-1272 in quantities specified in the contract schedule. One booklet shall include both the Type I and II information. Also, see paragraph 3.1.1.

3.1.1 Wiring diagrams.- The instruction booklet shall include wiring diagrams equivalent to Figures 1 and 2 hereof. Schematic and cabling diagrams are not required (modifies FAA-D-1272).

3.2 Ambient conditions.- The ambient conditions shall be those of normal test conditions, 1-3.2.22, FAA-G-2100/1.

3.3 Connectors.- All connectors, connector receptacles, plugs and sockets, used on the panels, shall be electrically and mechanically interchangeable with those specified herein, and shall have identical mating characteristics in order to function interchangeably with existing FAA equipment using the brand name connectors. The term "or equal" applies to all brand name components specified hereinafter, subject to the foregoing interchangeability requirement.

3.4 Leakage resistance.- The leakage resistance between wiring and ground, and between individual wires, shall be not less than 20 megohms at 500 V.

3.5 Isolation.- All panels shall provide not less than 60 dB isolation between circuits, when tested in accordance with the procedure given in paragraph 4 and subparagraphs thereunder of this specification.

3.6 Type I patch panel, 20-channel.- The following subparagraphs shall apply to Type I patch panel, 20-channel.

3.6.1 Panel.- The panel shall be a size C relay rack panel (see FAA-G-2100/1), constructed of cold rolled steel ASTM-A366 minimum of 0.060 inch (modifies FAA-G-2100/1), reinforced with 1/2 inch flanges at top and bottom edges. The flanges shall extend up to, but not into, the areas at the ends of the panel restricted by FAA-G-2100/1. Panels shall be finished in accordance with FAA-G-2100/1.

3.6.2 Connector receptacles, 8-contact.- The panel shall have 20 sockets, Cinch-Jones S-308-AB, or equal (see 3.3), mounted in two horizontal rows of ten each, symmetrically arranged and spaced on the panel, with plug-in access from the panel front, and with wiring on the back of the panel.

3.6.3 Connectors, 80-contact.- The panel shall have two 80-contact sockets J21 and J22, Elco Type 00-8018-080-217-019, or equal (see 3.3), mounted on brackets or standoffs at the right-hand end of the back of the panel as viewed from the rear. The panel shall have two 80-contact plugs P1 and P2, Elco Type 00-8018-080-217-016 (with hood and cable clamps), or equal (see 3.3), unmounted but wired, with the cable clamped to the back of the panel (see 3.6.5).

3.6.4 Designation strip.- A designation strip, complete with blank bristol board card and transparent plastic window, shall be mounted above each row of sockets on the front panel. Strip size shall be 7/16 inch x 16 inches.

3.6.5 Wiring.- Each horizontal row of ten S-308-AB sockets with one 80-contact socket and one 80-contact plug shall be wired and cabled separately from the other row on the same panel. Each S-308-AB socket shall be connected to both the 80-contact socket (paragraph 3.6.3) and at the opposite end of the panel, to the 80-contact plug with a flexible cable. The flexible cable shall be attached to the back of the panel at the left-hand end of the panel (as seen from the rear) with a strain clamp, and shall be at least 18 inches long, but not more than 20 inches, between the panel and the plug. Terminations at the 80-contact socket and the 80-contact plug shall be identical so that panels may be connected in parallel. Audio pairs shall be terminals 1-2 and 7-8 of the S-308-AB sockets (see Figure 1).

3.6.6 Nameplate.- In modification of the requirements of FAA-G-2100/1, the nameplate shall be in the form of a narrow strip (width suited to the available space), length not to exceed 12 inches, mounted either along the top edge of the panel, or, at the option of the contractor, along the bottom edge. The nameplate title (1-3.13, FAA-G-2100/1) shall be PATCH PANEL, 20-CHANNEL . The specification designation "Type I" shall not appear

on the nameplate. The other information required by FAA-G-2100/1 shall be arranged neatly along the strip in two or more horizontal lines (according to available space). Submission and approval of the nameplate design shall be in accordance with FAA-G-2100/1.

3.7 Type II patch cord panels.- The following subparagraphs shall apply to the Type II patch cord panels.

3.7.1 Panels.- The panels for the patch cord panels shall be the same size, construction, and finish as the patch panel, 20-channel as specified in 3.6.1.

3.7.2 Connector receptacles, 80-contact.- Each panel shall have eight sockets, J101 to J108, Cinch-Jones Type S-308-AB or equal (see 3.3), symmetrically mounted in two horizontal rows of four each on the left half of the panel as seen from the front. These sockets shall not be wired, and the socket lugs at the back shall be protected (by a phenolic plate or equivalent means) from inadvertent shorting.

3.7.3 Patch cord holes.- There shall be 16 holes in the panel for the patch cords. The holes shall be in two horizontal rows of eight each, on the right-hand half of the panel as viewed from the front. Bushing clamps shall be used to anchor and protect the cords. The holes shall be keyed to prevent the clamps from turning in the holes after installation.

3.7.4 Designation strips.- A designation strip, complete with blank bristol board card and clear plastic window shall be front panel mounted above each row of cord holes. The strips shall be 7/16 inch wide and of suitable length to provide marking space for each cord hole.

3.7.5 Terminal board.- A terminal board with 128 terminals shall be mounted with stand-off spacers, 2-1/2 inches from the rear of the panel directly behind the patch cord holes. The board shall be Type GEE (MIL-P-18177) epoxy glass-cloth, minimum thickness of 1/8 inch. The terminal lugs shall be hollow feed-thru turret type, slotted so the patch cord wire can be wrapped around the lug before soldering (modifies FAA-G-2100/1). No markings are required on the terminal board.

3.7.6 Patch cords.- Twelve patch cords shall be installed in the first 12 holes from the left. Patch cords shall be flexible with an outer jacket of polyvinyl cloride. Patch cords shall have two audio pairs and four other wires. The length of the patch cord shall be thirty inches between the panel and plug when installed through the front of the panel.

3.7.7 Plugs.- Each patch cord shall be terminated in an 8-contact plug, Cinch-Jones P-308-CCT, or equal (see 3.3).

3.7.8 Connection plan.- Audio pairs shall be connected to terminals 1-2 and 7-8 of the plugs. Patch cords shall be led through the patch cord holes and connected to the terminal board in order, beginning with the upper left cable as seen from the front of the panel, and proceeding from

left to right with the top row of patch cords, following with the lower row (see Figure 2).

3.7.9 Nameplate.- The nameplate (1-3.13, FAA-G-2100/1) shall be centered on the front panel. The nameplate title shall be PATCH CORD PANEL . The specification designation "Type II" shall not appear on the nameplate.

4. QUALITY ASSURANCE PROVISIONS

4.1 General.- See Section 4 of FAA-E-2100/1 for classification of tests and general methods of sampling and inspection. The contractor shall provide and maintain a quality control program which fulfills the requirements of Military Specification, MIL-I-45208A, Inspection System Requirements. The quality program shall be a scheduled and disciplined plan of events integrating all necessary inspections and tests required to substantiate product quality during design, development, purchasing, subcontracting, manufacture, assembly, acceptance, packaging, and shipping. An FAA Representative will witness the contractor's testing and inspections and will perform such visual and other inspections as deemed necessary to ensure compliance with contract requirements.

4.2 Type tests.- The following type tests shall be made under normal test conditions:

Isolation	3.5, 4.2.1, 4.2.2

4.2.1 Patch panel, 20-channel.- Test as follows:

(a) Test each group of ten sockets and associated wiring as a unit.

(b) Terminate each audio pair in a separate 600 ohm resistor.

(c) Each 8-contact socket has four single wires; connect three of the wires together as one side of the circuit, and, using the fourth wire as the common, terminate the circuit in a 600 ohm resistor. Check this combination as one circuit.

(d) Select one of the 20 audio pairs as the "measured pair". To each other circuit, one at a time, feed a 3000 Hz signal of 25 V $\pm$5 V; measure the voltage on the "measured pair"; the measured voltage shall be down referred to the applied voltage in accordance with 3.5. Repeat the above test for each of the 19 remaining audio pairs until each pair has been checked as the "measured pair". The audio voltmeter shall have an input impedance of not less than 10,000 ohms.

4.2.2 Patch cord panel.- Test the patch cord panels as specified in 4.2.1, except that it is permissible to check each cord as a unit.

4.3 Production tests.- The following production tests shall be made:

Wiring; circuit ring-out (each wire); continuity	3.6.5, 3.7.8
Wiring; leakage resistance (each wire); to ground and to each other wire	3.4

5. PREPARATION FOR DELIVERY

5.1 General.- See MIL-E-17555.

5.2 Packing.- One Type I patch panel, 20-channel, and one Type II patch cord panel forms a set, and shall be packaged together and so marked, insofar as equal contract quantities permit. Remaining single units shall be packaged separately and so marked.

6. NOTES

6.1 None.

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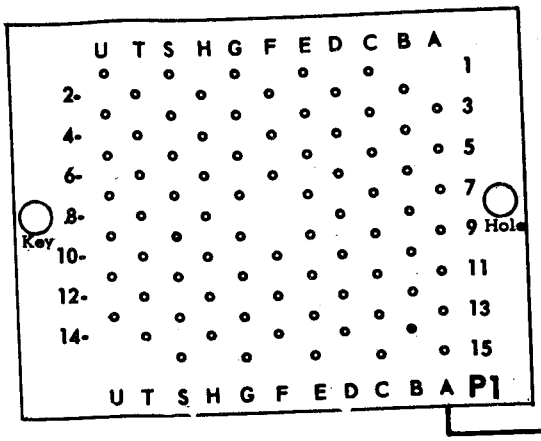
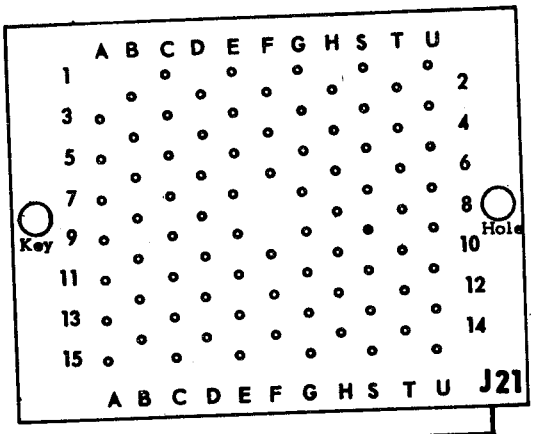
For Figures 1 and 2, see pages 7 and 8.

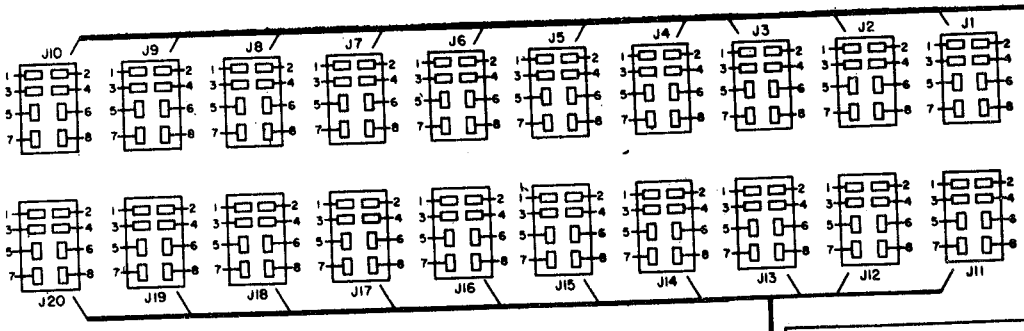


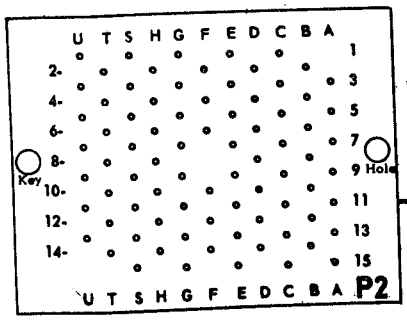


WIRING CONNECTIONS BETWEEN RECEPTACLES AND PLUG

FROM	TO*	FROM	TO*	FROM	TO*	FROM	TO*	FROM	TO*
J1-1	J21-B-10	J2-1	J21-D-10	J3-1	J21-F-10	J4-1	J21-U-11	J5-1	J21-U-7
-2	-A-9	-2	-C-11	-2	-E-9	-2	-S-11	-2	-T-8
-3	-B-12	-3	-D-12	-3	-E-11	-3	-T-12	-3	-H-8
-4	-A-11	-4	-C-13	-4	-F-12	-4	-S-13	-4	-S-9
-5	-B-14	-5	-E-13	-5	-G-13	-5	-G-11	-5	-U-9
-6	-A-13	-6	-D-14	-6	-H-14	-6	-H-12	-6	-T-10
-7	-C-15	-7	-F-14	-7	-S-15	-7	-U-13	-7	-G-9
-8	-A-15	-8	-E-15	-8	-G-15	-8	-T-14	-8	-H-10
J6-1	J21-B-2	J7-1	J21-D-2	J8-1	J21-G-1	J9-1	J21-S-1	J10-1	J21-U-1
-2	-A-3	-2	-C-1	-2	-E-1	-2	-H-2	-2	-T-2
-3	-B-4	-3	-D-4	-3	-F-2	-3	-G-3	-3	-U-3
-4	-A-5	-4	-D-6	-4	-F-4	-4	-H-4	-4	-T-4
-5	-B-6	-5	-C-3	-5	-E-3	-5	-G-5	-5	-U-5
-6	-A-7	-6	-C-5	-6	-E-5	-6	-G-7	-6	-T-6
-7	-B-8	-7	-C-7	-7	-F-6	-7	-H-6	-7	-S-3
-8	-C-9	-8	-D-8	-8	-E-7	-8	-S-7	-8	-S-5

*Also to Same Contact Number of P1





WIRING CONNECTIONS FROM J11 THROUGH J20 TO J22 AND P2 ARE THE SAME AS GIVEN ABOVE FOR J1 THROUGH J10 TO J21 AND P1.

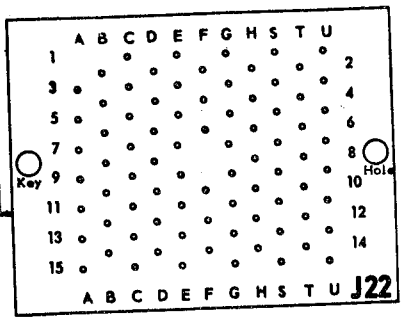


FIGURE 1
PATCH PANEL, 20-CHANNEL
WIRING DIAGRAM

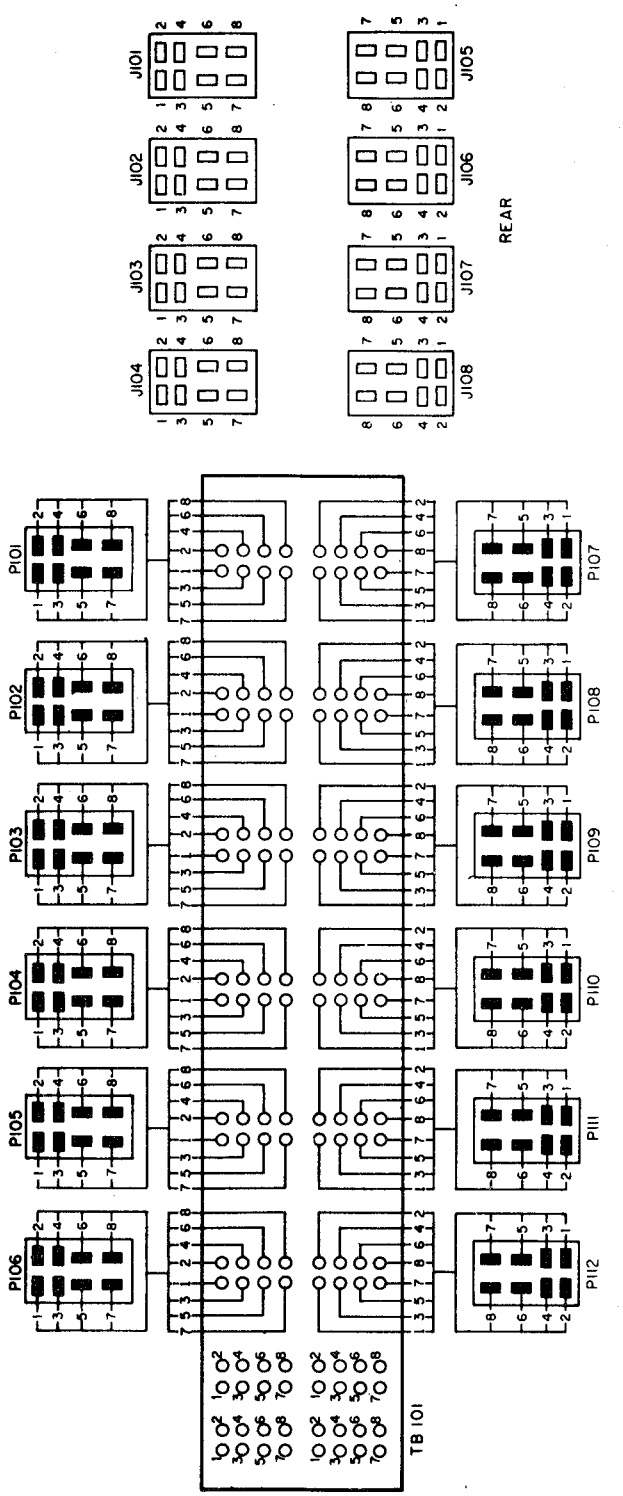


FIGURE 2
PATCH CORD PANEL
WIRING DIAGRAM